“In the long run we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the ocean is flat again”

J. M. Keynes Tract on Monetary Reform 1924
Flows of Funds Through U.S. Financial System

Loans by Banks and Other Financial Intermediaries

Lender/saver purchases of initial public offerings (IPOs) of stocks, bonds, and other securities in “primary” (initial sale) security markets
## Principal Regulatory Agencies of the U.S. Financial System

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1933</td>
<td>Organized exchanges and financial markets</td>
<td>Futures market exchanges</td>
<td>Federally chartered commercial banks</td>
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<tr>
<td>1974</td>
<td>National Credit Union Administration (NCUA)</td>
<td></td>
<td>Federally chartered credit unions</td>
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<tr>
<td>1863</td>
<td>State banking and insurance commissions</td>
<td></td>
<td>State-chartered depository institutions</td>
</tr>
<tr>
<td>1934</td>
<td>Federal Deposit Insurance Corporation (FDIC)</td>
<td>Commercial banks, mutual savings banks, savings and loan associations</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>Office of Thrift Supervision</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **US central bank founded in 1913**
- Founded:
  - US central bank: 1913
  - Securities and Exchange Commission (SEC): 1933
  - Commodity Futures Trading Commission (CFTC): 1974
  - Office of the Comptroller of the Currency: 1863
  - National Credit Union Administration (NCUA): 1934
  - State banking and insurance commissions: 1780s
  - Federal Deposit Insurance Corporation (FDIC): 1933
  - Office of Thrift Supervision: 1989

- **Requirements and Responsibilities**:
  - Requires disclosure of information, restricts insider trading
  - Regulates procedures for trading in futures markets
  - Charters and examines the books of federally chartered commercial banks and imposes restrictions on assets they can hold
  - Charters and examines the books of federally chartered credit unions and imposes restrictions on assets they can hold
  - Charter and examine the books of state-chartered banks and insurance companies, impose restrictions on assets they can hold, and impose restrictions on branching
  - Provides insurance of up to $100,000 (temporarily $250,000) for each depositor at a bank, examines the books of insured banks, and imposes restrictions on assets they can hold
  - Examines the books of commercial banks that are members of the system, sets reserve requirements for all banks
  - Examines the books of savings and loan associations, imposes restrictions on assets they can hold
The U.S. Federal Reserve System

Source: Federal Reserve Bulletin.
Federal Reserve Goals: “...maximum employment, stable prices, and moderate long-term interest rates.”

G - tY = ∆M + ∆B

G - tY = ∆M + ∆B

G - tY = ∆M + ∆B

G - tY = ∆M + ∆B

G - tY = ∆M + ∆B

G - tY = ∆M + ∆B
Links Between Monetary Policy and GDP: Complicated Monetary Transmission Mechanisms

- Monetary Policy

  - Traditional Interest-Rate Effects
    - Real interest rates (Monetary policy)
    - Exchange rate (Monetary policy)
  - Exchange Rate Effects on Net Exports
    - Stock prices (Monetary policy)
  - Tobin's q Theory
    - Financial wealth (Monetary policy)
  - Wealth Effects
    - Bank deposits (Monetary policy)
    - Moral hazard, adverse selection (Bank lending channel)
  - Balance Sheet Channel
    - Stock prices (Monetary policy)
    - Cash flow (Credit view)
  - Unanticipated Price Level Channel
    - Stock prices (Monetary policy)
    - Moral hazard, adverse selection (Household liquidity effects)
  - Household Liquidity Effects
    - Probability of financial distress

Components of Spending (GDP):
- Net Exports
  - Residential Housing
  - Consumer Durable Expenditure
- Investment
  - Residential Housing
  - Consumer Durable Expenditure
- Consumption
- Gross Domestic Product
Linkages Between Central Bank Tools, Policy Instruments, Intermediate Targets, and Policy Goals

**Tools of the Central Bank**
- Open Market Operations
- Discount Policy
- Reserve Requirements
- Interest Rate Paid on Reserves (2008), Quantitative Easing, Loans to Non-Banks, Credit Easing (Altering Composition of Fed’s Balance Sheet), Macroprudential Regulation of Credit Markets …

**Policy Instruments**
- Reserve Aggregates (reserves, nonborrowed reserves, monetary base, nonborrowed base)
- Interest rates (short-term such as federal funds rates)

**Intermediate Targets**
- Monetary Aggregates (M1, M2)
- Interest rates (short-term and long-term)
- Inflation rate

**Goals**
- Price Stability
- High Employment
- Economic Growth
- Financial Market Stability
- Interest-Rate Stability
- Foreign Exchange Market Stability

**NOTES:**
1) The **discount rate** is the interest rate charged to commercial banks and other depository institutions on loans they receive from their regional Federal Reserve Bank's lending facility--the discount window.

2) **Open-Market Operations** = Central bank buys and sells (short term) gov’t bonds from/to the private sector in an attempt to keep interest rates at specified target levels.

3) **Quantitative Easing (QE)** is when a central bank buys financial assets (mortgage-backed securities, long-term Treasury bonds, …) from the private sector in order to inject a pre-determined amount of money into the economy.

New tools used for global financial crisis after fed funds rate lowered to zero in December 2008
### TABLE 1: Advantages and Disadvantages of Different Monetary Policy Strategies

<table>
<thead>
<tr>
<th>Monetary Targeting</th>
<th>Inflation Targeting</th>
</tr>
</thead>
</table>

**Advantages**
- Immediate signal on achievement of target
- Simplicity and clarity of target
- Does not rely on stable money–inflation relationship
- Increased accountability of central bank
- Reduced effects of inflationary shocks

**Disadvantages**
- Relies on stable money–inflation relationship
- Delayed signal about achievement of target
- Could impose rigid rule (though has not in practice)
- Larger output fluctuations if sole focus on inflation (though not in practice)

Discretionary Policy
(implicit nominal anchoring on inflation control via setting of fed funds rate targets, etc.,...)
- Does not rely on stable money–inflation relationship
- "Demonstrated success in United States"


Lack of transparency
- Success depends on individuals in charge
- Low accountability

**Bernanke (2006->2014)**
**Janet Yellen (2014-present)**

Adopted by central banks in New Zealand, Canada, UK, Sweden, Finland, Australia, Spain...
Fed switched from M1 to M2 money supply measure in 1987

Fed Chairman Greenspan announces in 1993 Fed would no longer use monetary targets (including M2) as guides for monetary policy, instead would rely more on fed funds rate targets to control inflation.

Did Greenspan in effect use a “Taylor Rule” monetary policy for setting fed funds rate?

Taylor Rule (Simple Form) for the setting of the fed funds rate $i$:

$$[i - i^*] = a [\pi - \pi^*] + b \frac{Y - Y^*}{Y^*},$$

where

- $i =$ interest rate, $i^* =$ target interest rate, $\pi =$ inflation rate, $\pi^* =$ target inflation rate
- $Y =$ real GDP, $Y^* =$ potential (target) real GDP, and $\frac{Y - Y^*}{Y^*} =$ real GDP gap

Data Source: Federal Reserve: www.federalreserve.gov/releases
Inflation targeting appears to have been successful in 1990s in bringing down the inflation rate in three countries that adopted a Taylor-rule monetary policy.

But, was the decrease in inflation actually due to the inflation-targeting?

And what was happening with regard to other key economic indicators?

See [*] P. Howitt, “What Have Central Bankers Learned…” J of Macro 2012, 11-22, Syllabus Section VI.A
Financial Crisis ("Bank Crisis")

- A major disruption in financial markets characterized by
  - A sharp decline in asset prices
  - Failures of many financial & nonfinancial firms
Financial Crises Throughout World Since 1970

# The Cost of Rescuing Banks During Financial Crises in Several Countries

<table>
<thead>
<tr>
<th>Date</th>
<th>Country</th>
<th>Cost as a Percentage of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980–1982</td>
<td>Argentina</td>
<td>55</td>
</tr>
<tr>
<td>1997–2002</td>
<td>Indonesia</td>
<td>55</td>
</tr>
<tr>
<td>1990s–ongoing</td>
<td>China</td>
<td>47</td>
</tr>
<tr>
<td>1996–2000</td>
<td>Jamaica</td>
<td>44</td>
</tr>
<tr>
<td>1981–1983</td>
<td>Chile</td>
<td>42</td>
</tr>
<tr>
<td>1997–2002</td>
<td>Thailand</td>
<td>35</td>
</tr>
<tr>
<td>1993–1994</td>
<td>Macedonia</td>
<td>32</td>
</tr>
<tr>
<td>2000–ongoing</td>
<td>Turkey</td>
<td>31</td>
</tr>
<tr>
<td>1977–1983</td>
<td>Israel</td>
<td>30</td>
</tr>
<tr>
<td>1997–2002</td>
<td>South Korea</td>
<td>28</td>
</tr>
<tr>
<td>1988–1991</td>
<td>Cote d’Ivoire</td>
<td>25</td>
</tr>
<tr>
<td>1991–ongoing</td>
<td>Japan</td>
<td>24</td>
</tr>
<tr>
<td>1994–1995</td>
<td>Venezuela</td>
<td>22</td>
</tr>
<tr>
<td>1998–2001</td>
<td>Ecuador</td>
<td>20</td>
</tr>
<tr>
<td>1994–2000</td>
<td>Mexico</td>
<td>19</td>
</tr>
<tr>
<td>1997–2001</td>
<td>Malaysia</td>
<td>16</td>
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<tr>
<td>1992–1994</td>
<td>Slovenia</td>
<td>15</td>
</tr>
<tr>
<td>1998–ongoing</td>
<td>Philippines</td>
<td>13</td>
</tr>
<tr>
<td>1994–1999</td>
<td>Brazil</td>
<td>13</td>
</tr>
<tr>
<td>1995–2000</td>
<td>Paraguay</td>
<td>13</td>
</tr>
<tr>
<td>1989–1991</td>
<td>Czech Republic</td>
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<td>1997–1998</td>
<td>Taiwan</td>
<td>12</td>
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<tr>
<td>1991–1994</td>
<td>Finland</td>
<td>11</td>
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<tr>
<td>1989–1990</td>
<td>Jordan</td>
<td>10</td>
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<td>1991–1995</td>
<td>Hungary</td>
<td>10</td>
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<td>1990–1993</td>
<td>Norway</td>
<td>8</td>
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<td>1991–1994</td>
<td>Sweden</td>
<td>4</td>
</tr>
<tr>
<td>1988–1991</td>
<td>United States</td>
<td>3</td>
</tr>
</tbody>
</table>

Key Puzzle About Many Observed Financial Crises

- How can a country shift so dramatically from a path of reasonable growth before a financial crisis to a sharp decline in economic activity after a crisis occurs?

- **Possible Explanation:** Role of *positive feedback (reinforcement)* in which an initial shock (trigger event) leads to subsequent events that *amplify* the original shock.

**Example:** Deflation reduces borrowing for new spending, which further deflates prices.
Effects of US President Roosevelt's 1933-1938 "New Deal" legislation

Standard types of macro data shown for the Great Depression. Do these types of data provide a sufficiently complete picture to permit us to understand what caused the Great Depression?
What Caused 1929-1939 US Great Depression?

Three Different Theories Proposed:

- Breakdown in financial system was simply a response to (not a cause of) an initial decline in aggregate output. *(not consistent with the empirical evidence)*

- U.S. Great Depression caused by a rapid decline in money supply -- inappropriate monetary policy. *(“Monetarists,” e.g., Milton Friedman)*

- General disruption occurred in financial markets that then adversely affected aggregate output and prolonged the depression. *(Frederic Mishkin’s view)*

What caused 2007-2009 US “Great Recession?”
## Bond Ratings by Moody’s, Standard & Poor’s, and Fitch

(Mishkin, Table 6-1)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Moody’s</th>
<th>S&amp;P</th>
<th>Fitch</th>
<th>Definitions</th>
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<tbody>
<tr>
<td>Aaa</td>
<td>AAA</td>
<td>AAA</td>
<td>AAA</td>
<td>Prime Maximum Safety</td>
</tr>
<tr>
<td>Aa1</td>
<td>AA-</td>
<td>AA-</td>
<td>AA-</td>
<td>High Grade High Quality</td>
</tr>
<tr>
<td>Aa2</td>
<td>AA</td>
<td>AA</td>
<td>AA</td>
<td></td>
</tr>
<tr>
<td>Aa3</td>
<td>AA-</td>
<td>AA-</td>
<td>AA-</td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>A+</td>
<td>A+</td>
<td>A+</td>
<td>Upper Medium Grade</td>
</tr>
<tr>
<td>A2</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>A-</td>
<td>A-</td>
<td>A-</td>
<td></td>
</tr>
<tr>
<td>Baa1</td>
<td>BBB+</td>
<td>BBB+</td>
<td>BBB+</td>
<td>Lower Medium Grade</td>
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<tr>
<td>Baa2</td>
<td>BBB</td>
<td>BBB</td>
<td>BBB</td>
<td></td>
</tr>
<tr>
<td>Baa3</td>
<td>BBB-</td>
<td>BBB-</td>
<td>BBB-</td>
<td></td>
</tr>
<tr>
<td>Ba1</td>
<td>BB+</td>
<td>BB+</td>
<td>BB+</td>
<td>Non Investment Grade</td>
</tr>
<tr>
<td>Ba2</td>
<td>BB</td>
<td>BB</td>
<td>BB</td>
<td>Speculative</td>
</tr>
<tr>
<td>Ba3</td>
<td>BB-</td>
<td>BB-</td>
<td>BB-</td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>B-</td>
<td>B-</td>
<td>B-</td>
<td>Highly Speculative</td>
</tr>
<tr>
<td>B2</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>B3</td>
<td>B-</td>
<td>B-</td>
<td>B-</td>
<td></td>
</tr>
<tr>
<td>Caa1</td>
<td>CCC+</td>
<td>CCC</td>
<td>CCC</td>
<td>Substantial Risk</td>
</tr>
<tr>
<td>Caa2</td>
<td>CCC</td>
<td>CCC</td>
<td></td>
<td>In Poor Standing</td>
</tr>
<tr>
<td>Caa3</td>
<td>CCC-</td>
<td>CCC-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ca</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>Extremely Speculative</td>
</tr>
<tr>
<td>C</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>May be in Default</td>
</tr>
<tr>
<td>—</td>
<td>—</td>
<td>DDD</td>
<td>DD</td>
<td>Default</td>
</tr>
<tr>
<td>—</td>
<td>—</td>
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<tr>
<td>—</td>
<td>D</td>
<td>D</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

**AAA:** Year-1 default probability = 0.061%

**BBB:** Year-1 default probability = 0.978%

**CCC:** Year-1 default probability = 29.945%
The Making of a Mortgage CDO

The technology behind the collateralized debt obligation, or CDO, has been around since the 1980s, but only more recently has it been applied to mortgage-backed securities. It was designed to provide investors with greater diversification and disperse the risk of mortgage lending. But so-called mezzanine CDOs such as Norma actually served to magnify and concentrate the risk. Here is how they were made. Click on each step button below to learn more.

Step 1

The creator of a subprime residential mortgage-backed security -- or RMBS -- buys loans from all over the country, often from different lenders. Several thousand loans go into one mortgage-backed security. Because the security combines the specific risks of all the individual loans into a single pool, its investors as a whole are less exposed to the potential problems of any one borrower.
The Making of a Mortgage CDO

The technology behind the collateralized debt obligation, or CDO, has been around since the 1980s, but only more recently has it been applied to mortgage-backed securities. It was designed to provide investors with greater diversification and disperse the risk of mortgage lending. But so-called mezzanine CDOs such as Norma actually served to magnify and concentrate the risk. Here is how they were made. *Click on each step button below to learn more.*

**Step 2**
The residential mortgage-backed security repackage the income from the loans among different classes of bonds. Highly rated bonds are the first to receive income and the last to suffer any losses, but they also offer the lowest return. Low-rated bonds pay a better return, but are also among the first to take any losses if borrowers renego on the loans in the pool.

---

**Fitch Ratings scale**

- AAA
- AA+
- AA
- A+
- A
- BBB+
- BBB
- BBB-
- Not rated

---

**Mouse over the key elements for more info**
The Making of a Mortgage CDO

The technology behind the collateralized debt obligation, or CDO, has been around since the 1980s, but only more recently has it been applied to mortgage-backed securities. It was designed to provide investors with greater diversification and disperse the risk of mortgage lending. But so-called mezzanine CDOs such as Norma actually served to magnify and concentrate the risk. Here is how they were made. **Click on each step button below to learn more.**

**Step 3**
As many as 150 mortgage-backed bonds -- or other mortgage-linked investments -- are packaged into a single CDO. In the case of a mezzanine CDO, those investments are mostly linked to pieces of mortgage-backed securities that carry a rating of triple-B, just above junk. This boosts the yield the CDO can offer, but also makes its investors more vulnerable to losses.

---

**Fitch Ratings scale**

- **AAA**
- **AA+**
- **AA**
- **AA-**
- **A+**
- **A**
- **A-**
- **BBB+**
- **BBB**
- **BBB-**
- **BB**
- **BB-**
- **B+**
- **B**
- **CCC+**
- **CCC**
- **CCC-**
- **CC**
- **Not rated**

Mouse over the key elements for more info.
The Making of a Mortgage CDO

The technology behind the collateralized debt obligation, or CDO, has been around since the 1980s, but only more recently has it been applied to mortgage-backed securities. It was designed to provide investors with greater diversification and disperse the risk of mortgage lending. But so-called mezzanine CDOs such as Norma actually served to magnify and concentrate the risk. Here is how they were made. Click on each step button below to learn more.

Step 4

Much like an RMBS, the CDO issues new bonds, each with its own level of risk and return. The pieces of the CDO with middling ratings like A or triple-B are often sold off to other CDOs.

Fitch Ratings scale

Mouse over the key elements for more info

AAA  |  BB+
AA+  |  BB
AA   |  BB-
AAA- |  B+
A+   |  B
A    |  B-
A-   |  CCC+
BBB+ |  CCC
BBB  |  CCC-
BBB- |  CC

CDO issues new securities

CDO Assets

CDO Liabilities
The Making of a Mortgage CDO

The technology behind the collateralized debt obligation, or CDO, has been around since the 1980s, but only more recently has it been applied to mortgage-backed securities. It was designed to provide investors with greater diversification and disperse the risk of mortgage lending. But so-called mezzanine CDOs such as Norma actually served to magnify and concentrate the risk. Here is how they were made. Click on each step button below to learn more.

Step 5

Investors in the lower-rated pieces of a CDO are the last to get paid and the first to take losses. This protects investors in the higher-rated pieces, as long as all the CDO’s investments don’t go bad together. The similarity of the triple-B-rated investments in a mezzanine CDO, though, increases the likelihood that they will all suffer at once.
The Making of a Mortgage CDO

The technology behind the collateralized debt obligation, or CDO, has been around since the 1980s, but only more recently has it been applied to mortgage-backed securities. It was designed to provide investors with greater diversification and disperse the risk of mortgage lending. But so-called mezzanine CDOs such as Norma actually served to magnify and concentrate the risk. Here is how they were made. Click on each step button below to learn more.

Step 6
Credit-rating firms initially gave their highest triple-A ratings to three-quarters of the securities Norma issued. But as house prices plummeted and defaults rose across the country, investors and analysts expectations of losses rose well into the range that would hit the triple-B investments that Norma contained. As a result, the value of investments in Norma plummeted, and rating companies downgraded bonds issued by Norma to junk.
US Housing Price Bubble Burst in 2006

USA vs. East North Central House Price Indices
(1991Q1=100,SA)
Federal Government Budget Deficits (G-tY > 0): Cause or Consequence of Economic Crises?

USA Government Budget Deficits and Surpluses as a Percentage of GDP
Source: Congressional Budget Office (http://www.cbo.gov/)
U.S. Federal Receipts – Fiscal Year 2009 ($ Billions)

Total
$2,105 B

Source Data: OMB – 2011 Budget – Summary Table S-3
U.S. Federal Spending – Fiscal Year 2009 ($ Billion)

- Total: $3,518 B
- Defense: 782, 23%
- Social Security: 678, 20%
- Medicare & Medicaid: 676, 19%
- Other Mandatory: 607, 17%
- Other Discretionary: 437, 12%
- Interest: 187, 5%
- TARP: 151, 4%

Source: OMB - 2011 Budget - Summary Table S-3
Social Security, 20%
Defense, 19%
Medicare, 13%
Unemployment & other mandatory welfare spending, 16%
Medicaid & child health, 8%
Interest, 5%

Source: Kelvin Case, en.wikipedia, 8/1/2010
US Federal Government receipts and expenditures for 2010

Source: Kelvin Case, en.wikipedia
The Risks of Growing Entitlement Spending

Sometime between 2030 and 2040, mandatory spending will exceed government revenues.

Source: GAO Citizen’s Guide 2007
Medicare and Social Security Face Large Deficits

(HI=Hospital Insurance)
Debt = Accumulated value over time of deficits net of surpluses

Gross Fed Debt = Value of all debt instruments issued by the US Treasury;
Fed Debt Held by the Public

= (Gross Fed Debt) – (Fed Debt held by Fed government itself)
= Fed debt held (owned) by international investors, US private investors, US Fed Reserve Banks, & US state and local gov’ts

Source: Federal Reserve, Flow of Funds Accounts of the US, Third Quarter, 2010
Education pays

Unemployment rate in 2009

- Doctoral degree: 2.5%
- Professional degree: 2.3%
- Master's degree: 3.9%
- Bachelor's degree: 5.2%
- Associate degree: 6.8%
- Some college, no degree: 8.6%
- High school graduate: 9.7%
- Less than a high school diploma: 14.6%
- Average, all workers: 7.9%

Median weekly earnings in 2009

- Doctoral degree: $1,532
- Professional degree: $1,529
- Master's degree: $1,257
- Bachelor's degree: $1,025
- Associate degree: $761
- Some college, no degree: $699
- High school graduate: $626
- Less than a high school diploma: $454
- Average, all workers: $774